REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested.

Claims 1, 3-7, 9-19, 21-29, 31-46 and 48-55 are in this case. Claims 1, 3-7, 9-19, 21-29, 31-46 and 48-55 have been rejected. Claims 1, 4-6, 10-12, 15, 16, 22, 23, 25, 26, 29, 32, 33, 37-39, 42, 43, 48,49, 52 and 55 have now been amended.

35 U.S.C. § 103(a) Rejections – Huguet et al. (US 4,638,594) in view of Gardner et al. (US 4,755,942)

The Examiner has rejected claims 1, 3-7, 9-15, and 21-27 under 35 USC § 103(a) as being unpatentable over Huguet et al. in view of Gardner et al.. The Examiner's rejections are respectfully traversed. Claims 1, 4-6, 10-12, 15, 16, 22, 23, 25 and 26 have now been amended.

The Examiner states that Huguet et al. disclose "a method of assessing a state of a field grown crop" comprising collecting data pertaining to at least one plant derived parameter over a predetermined portion of the growth cycle of the crop, effected by at least one sensor positioned on the plant of the crop, analyzing the data collected to identify a trend in the data over at least a portion of the growth cycle, the trend being indicative of the state of the crop. The Examiner further states that although Huguet et al. fail to teach correlating the trend from one plant (tree) to another plant, Gardner et al. teach a method with similar steps as that of Huguet et al., and also mention correlating a trend between plants of the crop. Based on this, the Examiner concludes that it would have been obvious to one of ordinary skill in the art to incorporate the steps of correlating as taught by Gardner et al. in the method of Huguet et al., to study the trends of plants in the crop.

Applicant wishes to point out that the present invention is of a method and system employing remote, plant-positioned sensors of specific plant parameters which can be used to determine and correlate trends indicative of a state of a crop, in real-time, for precise and accurate crop management. Applicant is of the strong opinion that Huguet et al. alone, or in combination with the teachings of others, does not teach nor provide motivation for the use of a system of identifying, correlating and acting upon a variety of trends during crop growth, more particularly, when said trends are derived from analyzing data derived from two or more sensors collecting distinct and different plant derived parameters, from the same plant of the crop.

Huguet et al. teach a "process for controlling irrigation of plant crops" effected by collection of data reflecting daily variations in a single parameter linked to water requirements and resources of a specific part of the plant, i.e. changes in the girth of stem or fruit alone. As noted by the Examiner (Office Action, May 4, 2004, page 2, bottom of page), Huguet et al., in stark contrast to the methods of the present invention, do not teach correlating trends of plant derived parameters from one plant to another or correlating two trends from the same plant. Gardner et al. teach a method and apparatus for controlling irrigation of a crop from calculations of water stress conditions of the crop, employing measurements of crop canopy temperatures, air temperatures, and humidity. Although these measurements may be taken from a plurality of locations in the crop, they do not provide data on plant derived parameters. Further, a combination of data collection using the fixed or portable devices taught by Gardner et al. for measurement of such environmental parameters is counterintuitive to the collection of data pertaining to changes in plant derived parameters such as the girth of stem or fruit of trees as taught by Huguet et al.., since

Huguet et al. specifically exclude the detection of climatic parameters from the methods of their invention. Indeed, the Examiner has stated that "Gardner et al. are not relied on for a teaching of a plant derived parameter..." (Office Action May 4, 2004, page 8, last paragraph). Thus, one of ordinary skill in the art would not be motivated to combine the teachings of Gardner et al., with those of Huguet et al., to measure, analyze and correlate trends of more than one plant derived parameter to assess the state of a crop.

To further distinguish the present invention from prior art, and to expedite prosecution in this case, claims 1, 4-6, 10-12, 15, 16, 22, 23, 25 and 26 have now been amended to recite the limitation of collecting data pertaining to at least two different and distinct plant derived parameters, analyzing the data to identify trends, and correlating said data from the at least two different and distinct plant derived parameters, for example:

> Claim 1. A method of assessing the state of a field grown crop comprising:
> (a) collecting data pertaining to at least two different and distinct plant derived parameters over a predetermined portion of the growth cycle of the crop, wherein said collecting is effected by at least two sensors positioned on at least one plant of the crop and whereas the crop is unharvested, and
> (b) analyzing said data collected over said predetermined portion of the growth cycle to thereby identify trends in said data over at least a portion of said growth cycle, said trends being indicative of the state of the crop; and
> (c) correlating said trends with one another to assess the state of the field grown crop.

Thus, according to the methods taught in currently amended claims 1, 4-6, 10-12, 15, 16, 22, 23, 25 and 26, correlation of the trends exhibited by at least two

different and distinct plant-derived parameters is needed to assess the state of the crop. In contrast, Huguet et al. only teach recording of data from a single, identical parameter: the

> "daily variations in a parameter linked to the water requirements and resources of a specific part of a plant (column 2, lines 13-15)" or "daily variations in the diameter of a specific part of a plant..." [claim 1, step (a)],

wherein the sole parameters taught (trunk diameter, stem diameter and fruit diameter, column 2, lines 27-35) differ only in the location and size of the measuring device, and not in the character of the parameter measured nor in the significance of the measured parameter (restricted to water requirement). Even where Hugeut et al. disclose measuring a plurality of plants (see Fig. 4), only a single parameter is chosen, namely "diameter of a part of the tree" (column 6, lines 14-15). Further in this regard, Applicant wishes to point out the inaccuracy of the Examiner's assertion that "Huguet et al., as modified by Gardner et al. further disclose the parameter being stem diameter, fruit growth rate and stem elongation rate"(Office Action dated May 4, 2004, page 4, first paragraph). Contrary to the Examiner's assertion, careful reading of the prior art documents reveals that no measurement or means for measuring any plant-derived parameter other than the diameter of a specific part of a plant is disclosed or implied by Huguet et al.

Measurement of individual parameters, as taught by the present invention, for example, trends of transpiration state, as measured by sap flow (stem flux relative rate), can be correlated to trends of additional different and distinct parameters such as leaf, flower and/or fruit temperature, to more accurately determine cultivation conditions, and optimal time of harvest.

The collection of data, and correlation of trends from at least two plant derived parameters is recited in (previously canceled) claims 2, 20, 30 and 47:

> "The method of claim 1(15, 29, 42), further comprising the step of correlating said trend to an additional trend derived from data pertaining to an additional plant derived parameter..."

This feature of the present invention is neither described nor suggested by the prior art. The methods of Huguet et al., for measuring the diameter of a section of a tree(s) in order to trigger irrigation in the area, do not require the correlation of trends of data, neither from one, and certainly not from at least two plant derived parameters. On the contrary, Huguet et al. teach the use of a single, predetermined threshold of stem or fruit diameter, exceeding of which which would automatically (without any correlation of trends) activate the irrigation system (see column 5, lines 35-40, and claim 1). Combination of the teachings of Huguet et al., with the methods of Gardner et al., for sensing a plurality of conditions related to the agricultural area (see Abstract), are yet further unsuitable for the correlation of trends of data, neither from one nor from at least two different and distinct plant derived parameters. Thus, Applicant is of the opinion that one of ordinary skill in the art would not be motivated by the teachings of Huguet et al., neither alone, nor in combination with the teachings of Gardner et al., to make or use methods for precise and accurate crop management employing at least two remote, plant-positioned sensors of different and distinct plant parameters which can be used to determine and correlate trends indicative of a state of a crop.

Thus, it is Applicants strong opinion that the methods taught in now amended independent claims 1, 10 and 15, and all claims directly or indirectly dependent therefrom, are now patentable over the cited prior art.

The Examiner has rejected claim 28 as being unpatentable over Huguet et al. in view of Gardner et al. as above, and in addition, has stated that Huguet et al. discloses co-cultivating a first plant with a crop of a second plant. The Examiner's rejection is respectfully traversed.

It is Applicants strong opinion that the Examiner's assertion, in this case, stems from a basic and significant misunderstanding of the term "co-cultivation". Co-cultivation is an art-recognized term used to describe the cultivation of different entities in close proximity. The dictionary definition is "cultivation of two types of cell or tissue in the same medium" (Merriam-Webster Medical Dictionary, © 2002 Merriam-Webster, Inc.). In the field of plant biology, the term is often used to describe the cultivation of host plant species with the natural plant genetic engineer *Agrobacterium tumefaciens,* and, more traditionally, the intentional cutlivation of more than one type of crop in the same field or fields, as it relates to broadly divergent species:

> "Throughout history, all major civilizations have depended upon the co-cultivation of a cereal and a legume as a food source." (from International Legume Genomics Initiative White Paper, 2002);

or to more closely related species:

> "*B. napus* can cross with *B. rapa* (under co-cultivation 1.3% hybrid seed was formed) and produce hybrids of much reduced fertility; *B. napus* can also cross at low frequency with *B. juncea* (under field co-cultivation 4.7% hybrid seed formed)" (Biotech Basics, Monsanto, January 1999).

Thus, "Co-cultivation" is distinguished from the term "cultivation" by the implication of cultivation of two divergent entities together. Although Huguet et al. teaches cultivation of more than one plant (trees), no mention of co-cultivation of plants (trees) of divergent character or type is disclosed. Indeed, the Examiner notes that Huguet is silent regarding differences between the plants (Office Action May 4, 2004, page 5, paragraph 3). In this regard, the Examiner has reiterated the opinion that it "would be obvious...to select a 1st plant with more sensitivity...than a 2nd plant because it would be a wasteful and costly study...if one were to select a perfect plant". Applicant wishes to point out, contrary to the Examiner's assertion, that the method of the present invention does not involve post-facto selection of a sensitive plant from an already cultivated crop, rather the step of intentionally co-cultivating such a plant (or plants) along with the crop, to serve as a "sentinel" of potential dangers to the rest of the crop:

> Claim 28. A method of assessing the state of a field grown crop comprising:
> (a) co-cultivating a first plant with a crop of a second plant, said first plant being more sensitive to a change in at least one environmental factor or an infection by a pathogen than said second plant; and
> (b) monitoring at least one plant derived parameter associated with said first plant to thereby assess the state of the field grown crop.

Huguet et al. and/or Gardner et al. do not teach, nor do they infer, the intentional introduction of a more sensitive plant to a crop, the monitoring of a plant parameter from such a more sensitive plant, or the correlation of data or trends from such a more sensitive plant to data or trends from a less sensitive second plant. Thus, Huguet et al., alone or in combination with Gardner et al., does not, and cannot render the method of claim 28 obvious. Thus, it is Applicant's strong opinion that

the wastefulness and/or costliness of selecting a "perfect plant" from among an already cultivated crop, as cited by the Examiner, is irrelevant to the examination of instant claim 28, and as such Applicant respectfully requests withdrawal of the Examiner's rejection of claim 28.

35 U.S.C. § 103(a) Rejections – Huguet et al. (US 4,638,594) in view of Weller et al. (US 4,647,533) and Gardner et al. (US 4,755,942)

The Examiner has rejected claims 29, and 31-55 under 35 USC § 103(a) as being unpatentable over Huguet et al. in view of Weller et al. and Gardner et al. on the basis of obviousness. The Examiner's rejections are respectfully traversed. Claims 29, 32, 33, 38-39, 42, 43, 48, 49, 52 and 55 have now been amended.

The Examiner has stated that "it is notoriously well known...that a crop can be grown in a greenhouse first and then planted in the field later" and that Weller et al. teach, in claim 1, growing a crop in a greenhouse first and then planting the crop in a field. Applicant is of the strong opinion that the Examiner's rejection of the abovementioned claims is improperly based, since Weller et al. do not teach growing a crop in a greenhouse first and then planting the crop in a field, and further, since the combination of growing of a crop in a greenhouse, and then transplanting of said crop in the field, with the methods of Huguet et al. and Gardner et al. do not, and cannot render obvious the method and system for determining and correlating plant- and environmentally derived parameters indicative of a state of a greenhouse-grown crop of the present invention.

In responding to arguments made in this respect in the previous Response to Office Action (Response to Office Action, Dec 11, 2003), the Examiner asserts that

"Weller et al. teach...to grow a crop in a grenhouse first and then plant the crop in the field later (claim 1, parts b and c)". Applicant believes the Examiner to have misunderstood the claimed prior art invention.

Instant claims 29, and 31-55 teach methods and systems for assessing the state of a crop grown in a greenhouse. In stark contrast Weller et al. teach a method for the screening of strains of bacteria potentially suppressive of Pythium spp. in field conditions. The screening, as taught by Weller et al., comprises the steps of isolating potentially protective strains of fluorescent Pseudomonads, soaking seeds of grain crops in suspensions of the candidate bacteria, growing said grain crops in a greenhouse, under controlled conditions, selecting effective strains, and then testing the selected bacterial strains on seeds of grain crops under field conditions. Claim 1 of the cited prior art recites:

> "A method for screening bacteria for strains which will suppress Pythium sp. In field grown small grain crops, which comprises:
> (a) isolating a strain of bacteria from the rhizoplane, rhizosphere, or both...of small grain crops...
> (b) screening said strain isolated in step (a)...as follows:
> (1) growing the small grain crop of the variety to be protected in the greenhouse in the presence of said strain...;
> (2) growing the small grain crop...without the addition of said strain; and
> (3) selecting a strain which caused the plants...;
> (c) screening the strain selected in step (b)(3) for suppression of Pythium spp. in the field as follows:
> (1) growing the small grain crop...in...soil containing Pythium spp.;
> (2) growing the small grain crop...without the addition of said strain; and
> (3) selecting a strain which causes the plants...

In the Specification, Weller et al.. describe the three steps of the method: Step 1: Isolation of Strains of Potentially Suppressive Bacteria; Step 2: Screening of

the Bacterial Strains in the Greenhouse; and Step 3: Screening of the Bacterial Strains in the Field (columns 3 and 4). In Step 3, the planting of seeds of the small grain crop in the presence of the test strains of bacteria is described:

> "Field plots...are planted with seeds of the small grain crop of the variety to be protected..." (column 4, line 39-43)

Thus, Weller et al. do not teach to grow a crop in a greenhouse first and then plant the crop in the field later, as asserted by the Examiner, rather, the planting and growing of the crop once in the greenhouse, and in a later step, its planting (from seed) and growing in the field, and as such, cannot anticipate nor render obvious the methods of present invention, neither alone nor in combination with other prior art. Further, combination of the methods of screening bacteria for field control of Pythium spp., as disclosed by Weller et al., with the methods of controlling irrigation of plant crops of Huguet et al. and Gardner et al. would not achieve the desired result, that is, the method and system for determining and correlating plant- and environmentally derived parameters indicative of a state of a greenhouse-grown crop of the present invention, as set forth in instant claims 29, and 31-55.

The abovementioned notwithstanding, Applicant has elected to amend independent claims 29, 37, 42 and 55 to include the limitation of collecting data pertaining to at least two different and distinct plant derived parameters, analyzing the data to identify trends, and correlating said data from the at least two different and distinct plant derived parameters, for example:

> "Claim 29. A method of assessing the state of a greenhouse grown crop comprising:
> (a) collecting data pertaining to at least two different and distinct plant derived parameters over a predetermined portion of the growth cycle of the crop, wherein said collecting is effected by at least two sensors positioned on a

plant of the crop and whereas said crop is unharvested, and
(b) analyzing said data collected over said predetermined portion of the growth cycle to thereby identify at least two trends in said data over at least a portion of said growth cycle, said trends being indicative of the state of said the crop; and
(c) correlating said trends to one another to thereby assess the state of the field grown crop.";
and

"Claim 37. A system for assessing a state of a greenhouse grown crop comprising:
(a) at least two different and distinct sensors positioned on at least one unharvested plant of the crop, said at least two sensors being for collecting data pertaining to at least two plant derived parameters; and
(b) a user client being in communication with said at least one sensor, said user client being for receiving and optionally analyzing and correlating said data collected from said at least two sensors over a predetermined portion of the growth cycle of the crop to thereby identify at least one trend in said data over at least a portion of said predetermined portion of the growth cycle of the crop, said at least one trend being indicative of the state of the crop."

Thus, according to the methods taught in currently amended claims 29, 32, 33, 38-39, 42, 43, 48, 49, 52 and 55, correlation of the trends exhibited by at least two different and distinct plant-derived parameters is needed to assess the state of the greenhouse grown crop, further distinguishing the present invention from cited prior art inventions disclosed in Huguet et al. and Gardner et al. (as detailed hereinabove).

Thus, it is Applicant's strong opinion that the methods taught in currently amended claims 29, 37, 42 and 55, and claims directly and indirectly depending therefrom, including the collection of data from at least two different and distinct plant derived parameters, analysis of trends from said data, and the correlation

between said trends, to assess the state of the plants, are patentable over the cited prior art.

In view of the above amendments and remarks it is respectfully submitted that independent claims 1, 10, 15, 28, 29, 37, 42 and 55, and all claims which directly or indirectly depend therefrom are now in condition for allowance. Prompt Notice of Allowance is respectfully and earnestly solicited.

Respectfully submitted,

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